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SYNOPSIS TITLE:

Study of some biological activities in the tissue extracts of *Avicennia alba* Blume, a mangrove plant from Indian Sundarban Estuary.

INTRODUCTION:

The term "mangrove" is used to refer to a habitat comprised of a number of halophytic (salt-tolerant) woody, specialized types of plant species that can live on the edge, where rainforests meet oceans. Found on sheltered coastlines and river deltas, they grow in brackish wetlands between land and sea where other plants cannot grow. Mangrove plants thrive in extreme abiotic and biotic stresses such as high salinity, high and low tides of water, high temperature and moisture, strong winds, muddy anaerobic soil, insects and microorganisms. To thrive in such hostile environment, alternations in their physiological processes have occurred for which they may have chemical compounds, which protect them from these destructive elements. Many of these compounds or molecules have significant biological and other medicinal properties. Drugs of 'natural' origin, either the 'original' natural product, products derived 'Semi-synthetically' from natural products or synthetic products based on natural products models, play an invaluable role in the drug discovery process.

BACKGROUND:

Luxuriant patches of mangroves are found on all over the world. Among these the Sundarbans (India and Bangladesh) is the largest mangrove forest in the world both in size as well as biodiversity. Numerous mangrove plants have been used in folklore medicine from the long past and usage of these plants as traditional medicine are well known in many rural areas. In India, though works are currently going on to isolate the phytochemicals from different plant species including the mangroves, but a very small number of studies on the mangroves of Sundarban estuary have been reported till date.

Avicennia alba is a type of tropical mangrove plant under the family Acanthaceae has great medicinal value. The resin of this plant is used in birth control, ulcer treatment, skin diseases etc as well as the bark and seeds are used as a fish poison. This mangrove provides a rich source of tannins, alkaloids, polyphenols, napthoquinones. The chemistry of this mangrove plant tends to establish that they may be a source of novel compounds of beneficial biological activities. Synthetic drugs available in the market are not only expensive and inadequate for the treatment of diseases but also have harmful side effects. A number of reports have already been made regarding the continuous growing of bacterial resistance to various antibacterial agents. Decreased efficacy and resistance of pathogens to antibiotics has necessitated development of new alternatives. Methanolic extract of *Avicennia alba* showed wide spectrum of antibacterial activity against some oral and phytopathogens (Vadlapudi et al. 2009). Recently another investigation reported the antibacterial activity of *Avicennia alba* against some resistant pathogenic microorganisms (Vadlapudi, 2012). Ethanol extract of wood of this plant is highly active against *Bacillus subtilis* at several pH and temperature ranges (Gupta et al. 2012). Banerjee et al (2008) reported the antioxidant activity and reducing power of *Avicennia alba*. All these reported studies are at very

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preliminary level and an in-depth study is required to identify and characterize the phytochemical components responsible for the activities of the species from Sundarban estuary.

OBJECTIVE:

Study of some biological activities in the tissue extracts of *Avicennia alba.*

PLAN OF WORK:

1. Various tissues of the plant will be extracted employing standard methods.
2. The extracts obtained will be subjected to screening for different biological activities such as:
   i. Antimicrobial activity
   ii. Toxicity effect
   iii. Antitumour activity
   iv. Antioxidant activity
3. One such biological activity with promising potential will be studied further:
   a. The phytochemical component responsible will be identified.
   b. Partial characterization of this component exhibiting this activity will be studied.

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